

# ***GSM-batcorder 1.0***

## operation manual



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## About this instruction manual

This instruction manual for the GSM-batcorder contains important details concerning installation, operation and handling. Read this manual carefully and observe the following safety instructions, especially if you hand on this product to a third person. Keep this manual for further reading!

### Safety instructions

- Not all wind energy plants are equally suitable for using the GSM-batcorder. Some plants can exhibit extreme acoustic and/or electromagnetic emissions, e.g. drives, actuators, stall etc. . These no longer allow a reasonable acoustic capture of bats. Early planning and possibly a pilot survey could therefore be necessary.
- No liability can be accepted for material damages or physical injuries caused by improper handling or non-observance of the instruction manual, in such cases the warranty claims expire.
- Damages to the device and/or accessories caused by improper handling also lead to exclusion of all warranty claims. Please always observe the instruction manual exactly and solely use the original ecoObs parts and accessories or explicitly by ecoObs authorized parts.
- Only allow installation of the GSM- batcorder on the wind turbine generator (WTG) to be carried out by qualified personnel.
- Observe within the framework of the usage of this product effective regulations for installations and work in and on WTG`s.
- The installation recommended within this manual has to be modified due to the plants specific construction. Therefore we advise to consult the operator respectively the manufacturer of the plant at an early stage.
- Always make sure that the device and the accessories are fixed properly.
- Avoid strong mechanical stress on the GSM-batcorder and its components. In particular you have to secure that the bolted plug is not exceedingly strained. Strong vibrations, heavy shaking and dropping have to be avoided completely.
- Never leave children and pets alone with the device!
- Do not plug in the device directly to the mains supply, always use the provided ecoObs power supply unit!
- In case of a visible damage or other problems contact our support immediately (see end of manual). Never try to repair damages by yourself our

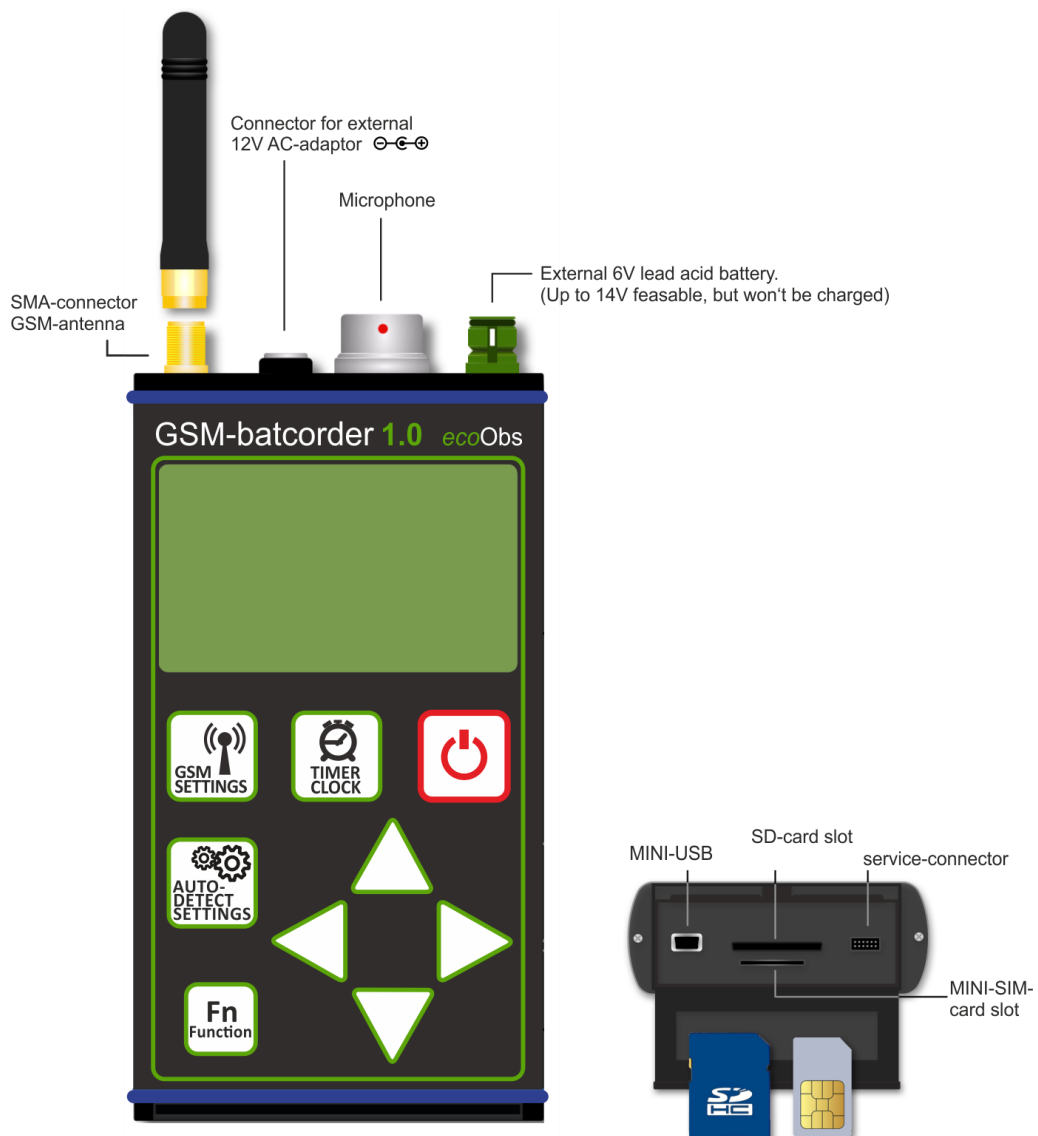
through unauthorized personnel. Do no longer use damaged or malfunctioning devices and accessories.

- You need a wireless connection to the mobile network system for using the GSM-batcorders GSM-unit via SMS-control and to have the possibility to receive a status report as text message. In particular plants with metal nacelles can inhibit the connection to the mobile network (shielding through the nacelles housing) respectively if there is no mobile service in the plants location. Therefore we recommend an early consultation of the plant's operator / manufacturer.
- The GSM-batcorder complies with the standards for electromagnetic compatibility, however it cannot be avoided that EM-fields couple in through the microphone and disturb the audio signal. Therefore try to keep away the device from electromagnetic and magnetic disturbance sources.
- The microphone capsule within the microphone disc is sensitive against mechanical force. Make sure that the microphone is not touched during installation and transport. Also the surface of the acrylic pane, in which it is inserted, must not be scratched.
- Never exchange the memory card while recording; this can lead to a complete loss of data.
- Avoid using the GSM-batcorder on a plant during wintertime. The extreme environmental conditions can damage the microphone severely.
- A mains connection (110-240V) is necessary for operating the GSM-batcorder. Therefore you have to make sure that there is an appropriate power supply (standard 230V socket) in the nacelle and that this carries power even if the plant is shut down. Contact the plant operator about this.
- To avoid damages caused by overvoltage the used 230V plug should be connected to a secured line.

Should there be any questions left, after reading this manual, you are welcome to contact our support (see end of manual).

## Components:

### GSM-batcorder



### GSM-antenna



The antenna can be screwed easily into the plug. Then tighten it manually (only with a little effort!) using the aerials metal base. Do not twist the aerials flexible section!

**Connector for external 12V adaptor**

Connect here the AC to 12V wall adaptor. The 12V power supply is for charging the 6V lead acid battery, if connected. It is not considered as a regular power supply for the GSM-batcorder.

**Connector for external battery**

Right hand of the microphone plug there is a green three pin plug for the external 6V-battery pack. The connector for the lead-storage-battery at the GSM-batcorder's top side is green with a white marking line. Be sure that the markings on plug and connector do match. To connect the battery to the GSM-batcorder the plug has to be slid into the connector easily, to separate again only pull the plug straight out of the connector.

(Any power source up to 14V can be used to run the GSM-batcorder, but only a 6V lead acid will be charged by the 12V AC-adaptor.)



Be aware: The battery connector has no reverse polarity protection. If connected in reverse the GSM-batcorder will be destroyed immediately.

**Connector for microphone**

Connect here your microphone disk.

Both, the connector and the plug have a red dot. They must be aligned.



This is a push-pull connector. Pull the plug at the knurled area to unlock it. You must not twist it!

**Mini USB port**

To the left of the SD-memory-card slot there is a mini- USB port (USB 2.0). You can use this port to connect the GSM-batcorder to an external host device (see “USB mode”), to energize the GSM-batcorder or to recharge the 6-Volt-battery pack. For

the charging process a minimum of 500mA power supply is required. The charging capability is off by default. This can be changed in the 'extended settings' menu.

### **Maintenance port**

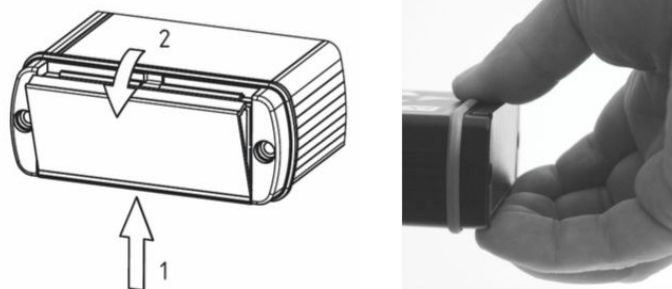
To the right of the SD-memory-card slot there is a maintenance port only used by ecoObs.

If you connect a non suitable device to this port, the GSM-batcorder inevitably will be destroyed!

### **SD-memory card and SIM-card**

The SD-memory card slot is at the bottom of the casing behind a lid. To open the lid you have to simultaneously push the lid up a bit (1) and swing it open (2) (see drawing).

You can best do this by pressing the fingers of one hand from below the lid while pushing with the thumb from above. You have to be sure that the thumb lies on the blue ribbon which encircles the casing NOT on the lid! You can then easily slide the lid open with the thumb.



With a little practice the lid can be opened easily. There is no great force necessary! If you use too great force you can damage the lid. Never use any tools to open the lid.

### **SIM-card function references**

The GSM-batcorder is as well able to send periodic status reports to a listed telephone number as to receive SMS - control commands. For this functionality you need a Mini-SIM-card (not included!). Please note: Avoid adaptors for Micro - or Nano-SIM-cards, they might interfere with the GSM-modules performance. You also have to make sure, that you have got a good reception in the nacelle with your network operator's SIM card.

**SIM-card installation**

The SIM-card slot also is at the bottom of the casing below the SD- memory card slot (see picture). To insert the SIM-card you have to first open the lid at the bottom of the casing as described before (see SD-memory card and SIM-card). Note: You should install the SIM-card before installing the SD-memory card (or remove the SD-memory card again if already inserted), as this makes it easier to access the SIM-card- slot.

Then you have to push the SIM-card carefully as far as it will go into the slot. The SIM-card's contacts have to face upwards, so that the gated edge lies at the right front. To remove the SIM-card, it has to be pushed lightly into the slot, it then pops out (push-in-push-out).

**SD-memory- card installation**

Note: The SD-memory card has to be pre-formatted for the GSM-batcorder, see Starting Up – SD-memory card preparation.

The memory card slot is placed in centre of the cases bottom. You have to slide it in with the contactors faced down until it got caught.

To remove the memory-card, it has to be pushed lightly into the slot, it then pops out (push-in-push-out).

The GSM-batcorder supports SDHC-cards and/or SDXC-cards with a capacity up to 256 GB. The cards do not need a specific speed level. Never change the memory cards while recording!

**Microphone disc**

The microphone disc consists of the following technical units:

Microphone capsule, temperature sensor, ultrasonic transmitter and a foam ring.

**The microphone capsule**

The microphone capsule is embedded into a disc made of plastic, which serves as a boundary layer. This disc must not be damaged! The capsule is sensitive against mechanical strains and must never be touched directly during transport or installation! The microphone membrane is safeguarded against raindrops by a fine microphone mesh, but long term humidity inevitably leads to corrosion and

therewith to an increasing loss of sensitivity. This however is part of the normal wear and tear, similarly to the fact that dust or sticky substances (dirt, gear oil from the plant etc.) can plug the microphone mesh more and more. Therefore we strongly recommend at least an annual checking of the microphone through the ecoObs GmbH.

**The temperature sensor**

The temperature sensor records the outside temperature on the microphone disc.

**The ultrasonic transmitter**

The ultrasonic transmitter sends a test signal daily at the beginning and at the end of the recording to check the microphone sensitivity.

**The foam ring**

The foam ring serves as a weather safeguard and e.g. prevents the water coming down the nacelle's casing from intruding.



Note: In case of a reinstallation or a microphone change the correction factor of the applied microphone disc (MCF) has to be entered into the GSM-batcorder on time. See "Adjustments – Microphone Correction Factor (MCF)".

**Annual Maintenance of Microphone Disc**

The microphone sensitivity changes due to atmospheric influences, such as rain, snow, frost etc. or dust and dirt. Also the mechanical stress during mounting and dismounting can influence the microphone's sensitivity. To guarantee the simultaneous application and comparable recordings, we strongly recommend an annual inspection of the microphone capsule by the ecoObs GmbH. There the microphone disc will be tested and if a change in sensitivity has been detected the microphone will either be calibrated new or will be replaced.

Please send the complete microphone disc without the GSM-batcorder and battery, and always with a completely filled out return form (this you can download at our homepage under "downloads"). For the mailing address see at "SUPPORT".

You can find the current charges for testing and calibrating at our online pricelist on our homepage.

**Entering the new MCF-value after maintenance:**

The new MCF-Value is written on the microphone disc and you can also find it on the included information label.

1. Start the GSM-batcorder as usual.
2. Change into the AUTODETECT-SETTINGS-menu => EXTENDED SETTINGS
3. Change the value in the MCF-line with the up/down arrow buttons

Therewith the new value is set and the GSM-batcorder is again ready for operation with the newly maintained microphone disc.

## **GSM-batcorder start-up**

**Additionally required and not included in the delivery:**

- **SDHC-memory card** (up to 32 GB) or **SDXC-memory card** (up to 256 GB).  
Do not use adaptors! No special speed class is needed!
- **Mini – SIM card** (for surveillance of operation by SMS- messages). Avoid adaptors for Micro- or Nano-SIM-cards!

**Preparation of SD-memory-card**

After inserting the correctly formatted SD-memory-card (exFat or NTFS) into the GSM-batcorder you will be asked to carry out another internal formatting process. This measure is necessary otherwise no recordings with the GSM-batcorder are possible. You should execute the formatting step before installing and using the device in the plant.

Always enable **write protection** on your SD-card before you insert the card into your PC/Mac again.

## Power supply

### 6V-lead-gel storage battery

In the GSM-batcorder delivery a 6V-lead-storage battery is included. As delivered the battery is pre-charged and can be applied immediately.

At the end of the monitoring season, before the winter break and before the new spring season, you always should charge the 6V-lead storage battery completely. The therefore needed battery charger is not included. Every customary charger for 6V-lead-acid batteries is suitable.

The connector for the lead-storage-battery at the GSM-batcorder's top side is green with a white marking line. Be sure that the markings on plug and connector do match. To connect the battery to the GSM-batcorder the plug has to be slid into the connector easily, to separate again only pull the plug straight out of the connector.

At the battery the cable shoes have to be connected in correspondence with the marking: red = positive pole, black = negative pole.

The GSM-batcorder's charging electronic is designed for the delivered 6V-lead-storage battery. You can also connect a 12V-lead-storage battery, but **this one will not be charged!**

Pay attention to connect the cables properly to the battery! Black to black (negative pole) and red to red (positive pole), otherwise the GSM-batcorder can be destructed!

Warning: Other types of rechargeable batteries (NiMH, Li-Ion etc.) are not supported and can in the worst case burn and even explode. Never ever connect those!

The power supply via power pack is for charging the batteries and for setting the GSM-batcorder. In record mode the GSM-batcorder is supplied by the rechargeable battery. Neither an operation only via power supply nor only via battery is therefore possible!

### AC-Power supply

Make sure that there is an adequate 230V power supply available in the nacelle. That has to constantly be current carrying, even when the plant is shut down. The cable length from charger to control module is approximately 1.2 meters. Therefore it may be necessary to plan for an additional extension cable from socket to charger. The power supply may be fixed additionally to its plug-in-location, so it cannot incidentally fall out due to vibrations (duct tape has proven suitable for this).

To avoid any interference of the 230V power supply to the GSM-batcorder's recordings, the batcorder is galvanically isolated from the mains and operates with

the delivered 6V-storage battery. As power supply only use the standard delivered 12V-power supply unit.

**Running without 230V AC-adaptor**

The GSM-batcorder can be used without the external 12V adaptor. The runtime of your GSM-batcorder is then limited by the capacity of the external battery. If you connect a 6V lead acid battery our solar panel can be used to charge the battery.

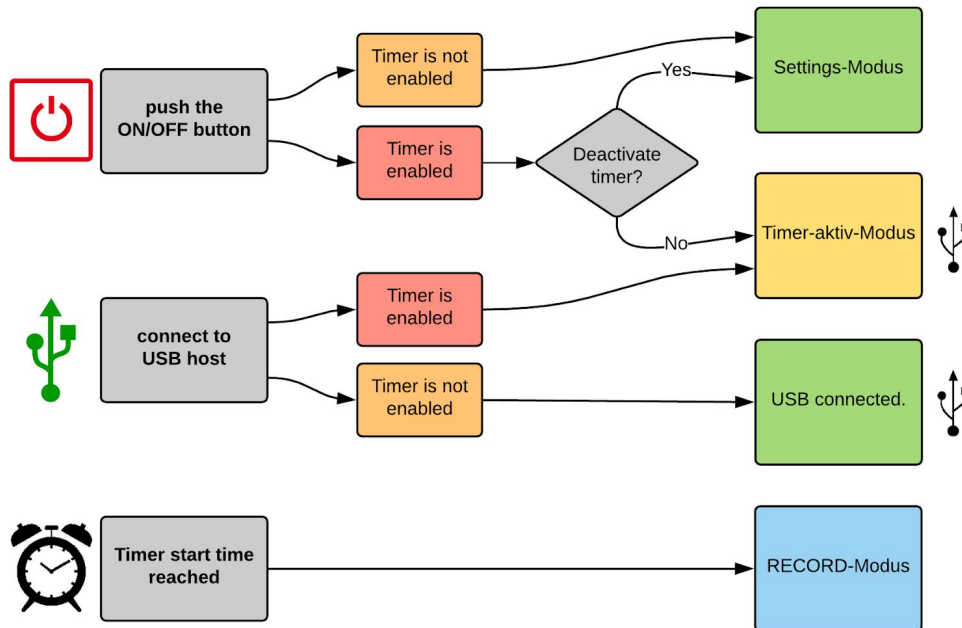
In timer mode at the end of the record season you will receive a “AC adaptor down” SMS. This warning-SMS can be deactivated in the ‘extended settings’ menu.

### Problems with the power supply

- If the GSM-batcorder has no power supply (no mains supply and/or the rechargeable battery is not connected or not recharged) at the chosen starting time (begin of recording session), it will not start automatically! You have to secure that the mains supply as well as the 6V-rechargeable battery are always connected!
- The Timer can be activated, even if the mains supply is defect or not available, only with a connected rechargeable battery. 10 min after the message, that the Timer is activated the GSM-batcorder goes into a sleep-mode, the display is then shut down completely. If there is enough power from the rechargeable battery available, the GSM-batcorder starts recording at the chosen starting-time, an additional SMS will be send to indicate that no mains power is available. The GSM-batcorder works until the rechargeable battery is flat.
- If the mains-power supply is shut down during recording (for example a power failure), the GSM-batcorder stays operational and records as usual. After the stopping-time it ends the recording automatically and sends an additional SMS to indicate that there is no mains supply. 10 minutes after stopping time the GSM-batcorder then goes into sleeping mode and the display shuts down. The GSM-batcorder carries on like described in the previous item.
- The Timer can also be activated if the rechargeable battery is not connected or flat, only with a connection to the mains power supply. When the Timer has been activated with the “right-arrow-button” (), there is a message that the battery is lacking or dead. You then have to confirm separately that activation is nevertheless wanted.

If in the meantime no rechargeable battery is connected, the Timer tries to start the recording session at the chosen starting time, the display then changes to red and the message appears that no battery is connected, also a SMS is send to indicate the lack of the rechargeable battery and a log-file entry is done. **No recording session is then possible; no bat-calls will be recorded!** The GSM-batcorder stays at the Timer-enabled mode (Timer active, display illuminated yellow) and if there is still no rechargeable battery connected in the meantime, this procedure will be repeated at the next attempts to start a recording session!

## Starting the GSM-batcorder and connecting to a USB-Host



There are 3 ways to turn the GSM-batcorder on:

- Press the on/off-button.** If the timer is not enabled you will get into the settings menu. If the timer is enabled you will be asked whether you want to disable the timer or not. If you answer YES you will get to the settings menu. Otherwise, if a 12V power source is connected, the device will switch to *timer active mode*. It will then stay in this mode until timer start time is reached and then switch to *Record mode*.
- Connect a USB host or USB power source.** If the timer is not enabled the GSM-batcorder will connect to your USB host. If timer is enabled the device will switch to *timer active mode*. It will then stay in this mode until timer start time is reached and then switch to *Record mode*.
- The timer-Start-time has been reached.** The GSM-batcorder switches into *Record-mode*.

## Settings



All settings should be carried out before installing the GSM-batcorder on the wind energy plant.

### Menu navigation

For navigation between the input fields use the left/right arrow keys (◀/▶). Values and YES/No options can be changed with the up/down arrow keys (▲/▼).

### Status information given in the status line



At the top, from left to right:

#### **Display of active menu:**

**MAIN / AUTOD. / EXTEND. / TIMER / GSM**

If you are not in one of those menus, nothing is displayed.

#### **USB-link information:**

USB, if there is a technical connection to an external end device, otherwise nothing is displayed.

#### **Temperature:**

Current temperature in °Celsius, measured with the sensor in the microphone.

#### **Mobile phone connection/GSM-module:**

G, your batcorder is connected to the GSM-network provider and ready to receive SMS

‘+’ your batcorder is connected to the GSM-network provider but you still have to send a test-SMS to complete the network registration.

if there is no connection to the GSM-network providers, nothing is displayed.

***Mains power supply:***

Plug-symbol, if mains current available, otherwise no symbol.

***Internal working voltage:***

7.1V, display of current internal working voltage in Volt.

***current Time:***

15:22, display of time set (24h display)

**MAIN settings (MAIN)**

```
MAIN          21.3°    7.1V 15:22
-----
Filecode:  ABC_123_XX
Deleting card: Fn + UP

FREE MEMORY:  60787/60788 MB
FILES ON CARD: 4

TIMER: 21:30 -> 05:30
```

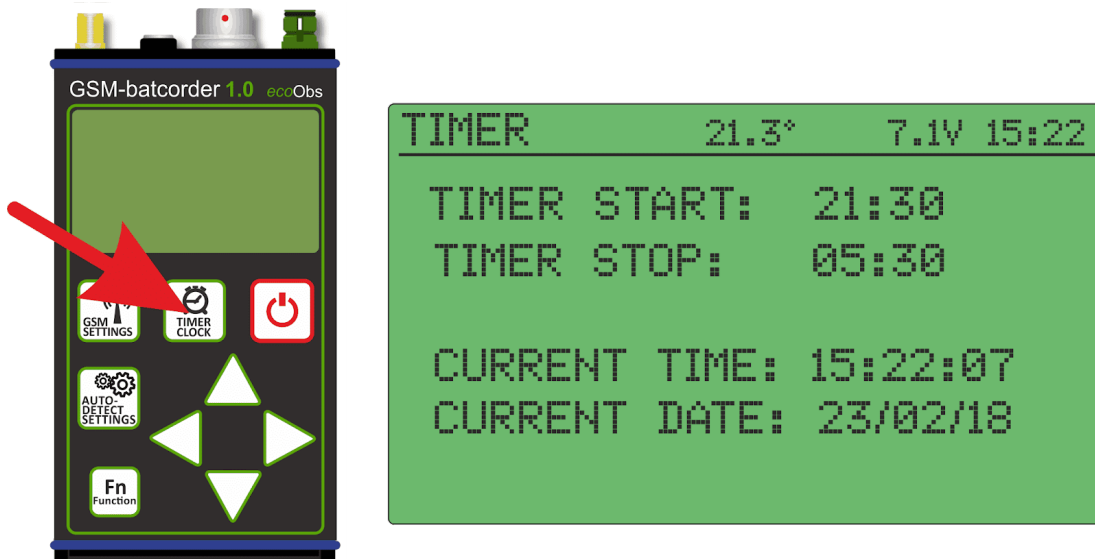
After starting the GSM-batcorder you get to the main menu (MAIN). Here you can set the memory card. The current Timer setting is displayed, also the amount of free memory of the SD-memory-card and you can see how many files are already on the card.

The Filecode (filename) can have ten randomly chosen alphanumeric characters and the low line (\_). This freely selectable filecode will be integrated in every filename and can be used for example to encode location or project to relate your data later.

With the “right arrow” button (►) you can go to the next character, with the “left arrow” button (◄) you can go back to the previous character. Using the up/down arrow (◄/►) you can change values.

With the **delete function** (deleting card) you can erase the data on the inserted memory-card. Push the “Fn”-button together with the “up” button to do this. After a security query the memory card’s data is deleted.

## TIMER/CLOCK settings (TIMER)



Via the TIMER/CLOCK button you can set the current date and time, as well as the timer start and stop time. (Note: The change between summer- and winter time has to be changed manually!)

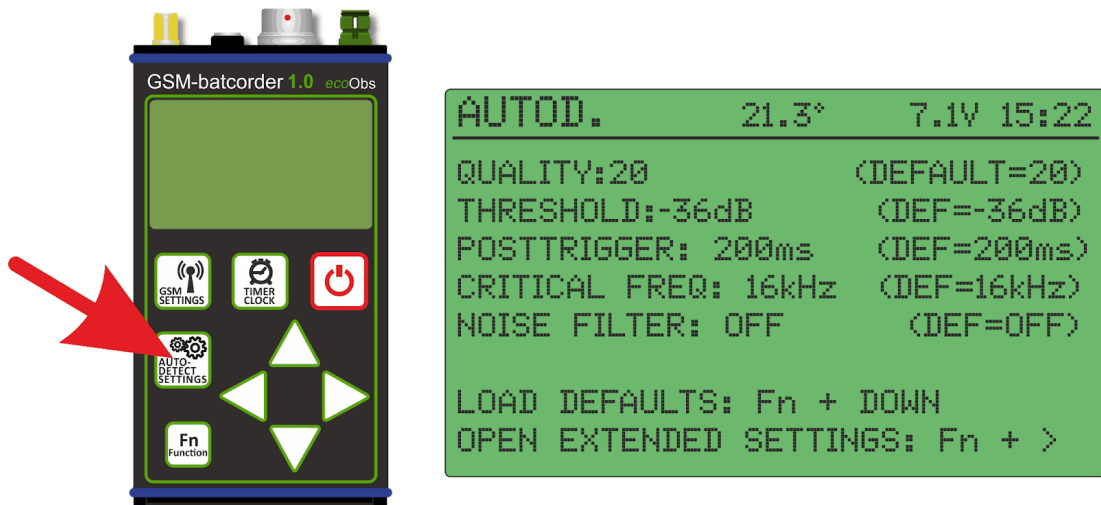
With the “right arrow” button (►) you can go to the next character, with the “left arrow” button (◄) you can go back to the previous character. Using the up/down arrow (▲/▼) you can change values.

At the timer input field you can also choose and set if the 6V-rechargeable battery should be charged by using the GSM-batcorder’s USB connector. *Note: A minimum of 500mA current supply through the USB connector is needed.*

To use this possibility you have to select “YES” at the “CHARGE BATTERY WITH USB” option.

Pressing the TIMER/CLOCK button again brings you back to the MAIN menu.

## Auto Detect settings (AUTOD.)



With the button AUTODETECT SETTINGS you can set the parameters for signal recognition (Quality, Threshold and Critical Frequency), the posttrigger length, the noise filter.

With the “right arrow” button (►) you can go to the next line, with the “left arrow” button (◄) you can go back to the previous line. Using the up/down arrow (▲/▼) you can change values.

### Default Settings

By pressing the Fn-button the GSM-batcorder standard values for Quality=20, Threshold=-27dB, Posttrigger=400 ms, Critical Frequency = 16 kHz and Noise Filter = OFF can be set. These values are optimally aligned for analysis with our software programs bcAdmin and batIdent.

By choosing the value for Threshold you have to weigh up between quality and quantity. Also there is an increase in recorded disturbances with a decrease of the Threshold value (= higher sensitivity). But in most cases this is negligible.

In most German states there are specifications for the GSM-batcorder adjustments according to a guideline for survey. Normally these comply with the specifications from the BMU-project of the Universities of Hanover and Erlangen-Nuremberg. The needed adjustments for being concordant to this project are (as at April 2014):

Threshold = -36 dB, Posttrigger = 200ms, Critical Frequency = 16 kHz, Quality = 20.

**Noise-Filter**

With the GSM-batcorder you have the possibility of disturbance suppression. Therefore numerous recordings of disturbances have been analyzed and so it was possible to adjust the bat call detection, so that short events, which are surely no bat calls, are identified and not recorded. You can find the disturbance suppression in the GSM-batcorders Autodetect-Settings-Menu as Noise-Filter. Microphone Correction Factor (MCF)

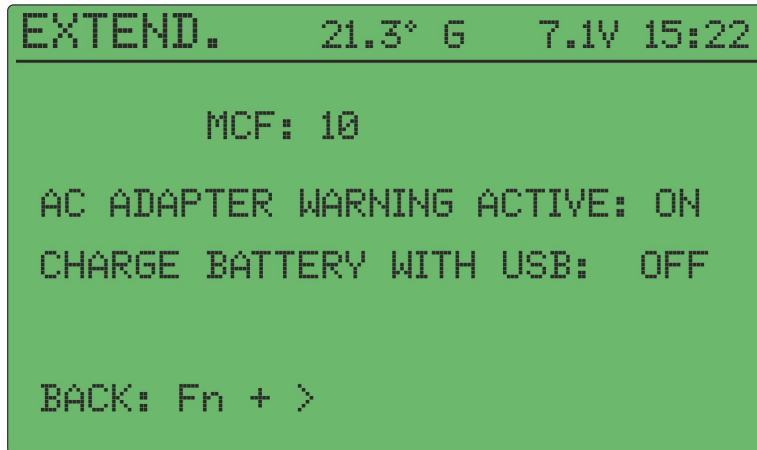
To ensure the simultaneous use and a comparability of recordings between the GSM-batcorder and the microphone disc, both have been calibrated before delivery (40 kHz with 96 db SPL equates full-scale deflection). The Microphone Correction Factor is given on the microphone as "MCF: XX". (For XX there is the real number on the label of your microphone disc.) You have to enter this Microphone-Correction-Factor in the Menu Extended Settings under MCF.

If the microphone has to be changed, because for example the previous microphone has lost sensitivity, an adjustment of the MCF with the new value of the new microphone is necessary. (See Annual Service at end of manual).

To restore the GSM-batcorder to standard-values by pressing the FN-button does not change the inserted MCF value.

Pressing the AUTODETECT SETTINGS button again brings you back to the MAIN menu.

## Extended Settings (EXTEND.)



### Microphone Correction Factor (MCF)

Using the up/down arrow (▲/▼) you can change values.

The MCF for your particular microphone is written on the backside of the mic.

### AC Adapter warning active ON/OFF

Enables/disables the warning-SMS “*Attention: 12V supply is down. BC will switch to sleep mode in 10 minutes. In sleep mode no SMS will be received! But don't panic. Timer is still active!*”

The SMS is enabled by default. Disable it if you run the GSM-batcorder only on external battery without 12V power supply.

### Charge battery with USB ON/OFF

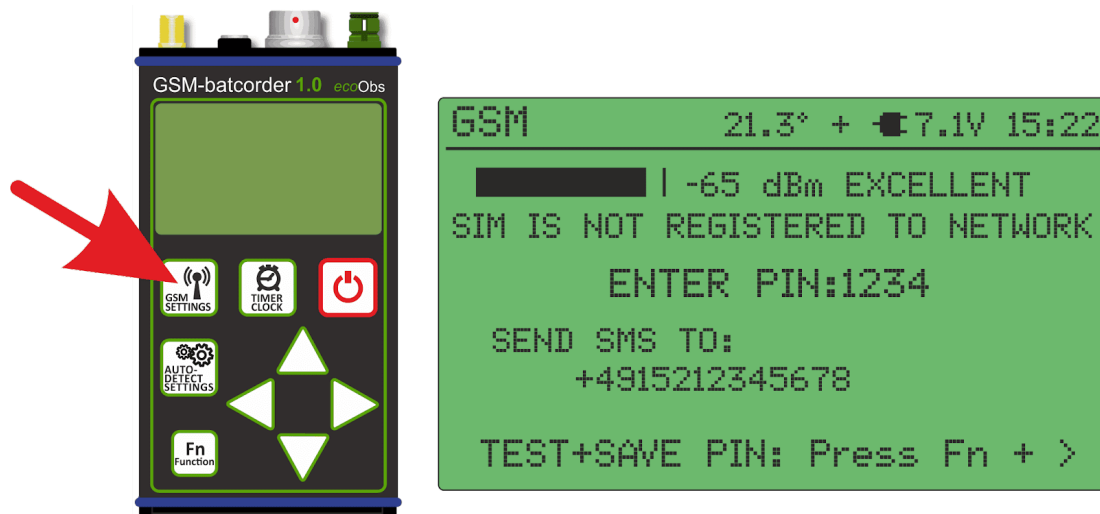
The external 6V battery can be charged with the power provided by an USB Host.

The Host must be capable of delivering a minimum current of 0.5A.

Disabled by default.

Press Fn + (▶) to go back to AUTODET. SETTINGS or press the AUTODETECT-SETTINGS button to go back to main menu screen.

## GSM Settings (GSM SETTINGS)



### Enter PIN and telephone number

You can enter the PIN of your SIM card and the telephone number for sending the status reports via SMS with the GSM SETTINGS button. You can although send a test-SMS to your chosen telephone number.

If no SIM-card has been detected or if you have inserted a SIM-card with adaptor, “NO SIM INSERTED” will be displayed.

At the first line of the GSM SETTINGS menu the discovered signal strength is displayed. The signal strength detection can demand a couple of seconds.



Note that at first only a general signal strength is identified. If your operator's network is received in sufficient quality can only be checked after you have entered the PIN.

### Entering the PIN

*Note: Some SIM cards do not need a SIM PIN, the following menu will than automatically be skipped.*

At the PIN line a 4-digit SIM PIN is displayed. You can change the PIN with the up/down arrow buttons (▲/▼), with the “right arrow button” (▶) you can go to the next digit. By pressing the “Fn” button together with the “right arrow” (▶) the PIN will be

saved and tested. If the PIN is correct the GSM module will log in into your providers network. In case this fails or the PIN is invalid an error message is displayed.

If the PIN has been entered wrong three times, the SIM-card is going to be locked and can only be unlocked by entering the PUK. The PUK cannot be entered via the GSM-batcorder. Therefore you have to insert the card into a mobile phone and have to carry out the cancellation of the lock there. The entry of the PIN will only be necessary again, when the SIM-card has been changed.

By pressing the “right arrow” button (►) now you reach the menu for entering the telephone number to which the GSM-batcorder shall send its SMS-status reports.



## Telephone number for status-SMS

With the up/down arrow buttons (▲/▼) the telephone number can be entered, with the “right arrow button” (►) you can go to the next digit.

The telephone number always has to be entered as following: country code + network code (without the first zero!) + call number. This means, in your own country you have to enter your country code as well. For example, for a fictitious mobile phone telephone number in Germany like “0151 12345678” you would have to enter, first the country code (“49” for Germany in this example) + network code without first zero (= 151) + phone number = “+4915112345678”.

To erase redundant digits at the end of your telephone number move the cursor with the “right arrow” button (►) onto the redundant digit and scroll with the up/down arrow button (▲/▼) to the space character (“ ”). Repeat this step if necessary for further redundant digits.

## Test SMS

After entering and saving the telephone number you have the opportunity to send a test-SMS to the entered telephone number, to check the number and the transmission of the SMS. You can do this by pressing the “Fn”-button together with the “right arrow” button (►). If the transmission of the test-SMS has been successful, there is a message on the GSM-batcorder display. Afterwards the main menu (MAIN) is displayed automatically. In the next few minutes the SMS should have reached your SMS-compatible-end device (like a mobile phone). If not, recheck the correct entry of your telephone number into the GSM-batcorder.



**It is mandatory to successfully send a test-SMS for using the SMS-Status functionality !**

## Status-SMS

The GSM-batcorder automatically sends a status-SMS after finishing the scanning (= at Timer Stopping Time) to the entered telephone number, if there is a connection available to the respective operator's mobile network. The message normally contains the following information:

<b>bc: XXXXXXXXXXX</b>	File code of the GSM-batcorder
<b>free memory: xx.xGB</b>	Free memory on the SDHC-Card
<b>files total: xxxxxx</b>	Number of recordings
<b>last night: xxxxx</b>	Number of recordings of the previous night
<b>TSL Start: dB loss</b>	Signal level at session start (in dB)
<b>TSL Stop: xdB loss</b>	Signal level at session end (in dB)
<b>Battery: x.xxV</b>	Voltage of 6V- lead-gel-storage-battery
<b>External Power: xx.xxV</b>	Voltage feed of mains supply
<b>Temp now: xx.xC</b>	Current temperature in °C, at the end of the recording time
<b>Temp min: xx.xC</b>	Minimum temperature in °C, during recording session

## Timer Recording

### Set Timer

The timer function controls the time-controlled, automatic recording session of the GSM-batcorder. At the times chosen the device activates or deactivates. You can choose starting – and stopping time freely.

With the TIMER/CLOCK button you can get to the Timer-display, there you can select the switch- on or off times. With the “right arrow” button (▶) you can go to the next line, with the “left arrow” button (◀) you can go back to the previous line. Using the up/down arrow (▲/▼) you can change values.

A maximum runtime of 23:59 hours is possible.



**To recharge the rechargeable batteries a minimum of 3h break should be observed between each recording session.**

To activate the Timer you press the START/STOP button directly out of the TIMER/CLOCK menu so the device goes into Standby-mode. The GSM-batcorder now asks you, if you wish to run a microphone test. (SET TSL-REFERENCE-VALUE). It is advisable to run this measurement, if the device is installed and the microphone disc is at its final position. With pressing the “left arrow-button” (◀) you can although skip this option. *At the beginning and at the end of a nocturnal recordings session it is standard that a microphone test is performed automatically.* After this enquiry follow the message that the timer is enabled. The GSM-batcorder now goes into standby-mode. The display still stays illuminated yellow as a standby-operation display.

By pressing the ON/OFF-button again the Timer can be deactivated. After confirming the following enquiry a Status-SMS is send and a Log-File-Entry is done. The GSM-batcorder then changes back to the main menu (MAIN).

Do not change the SD-card after activating the Timer-mode! Should you insert a new SD-card, which has not been formatted by the GSM-batcorder; the GSM-batcorder will not record when automatically started.

At the chosen starting time the GSM-batcorder starts automatically and activates the Scanning-mode. The display illumination then changes from yellow to blue.

When the Timer starts, the mains power is going to be galvanically isolated from the device to avoid electrical interference in the recordings. The GSM-batcorder now gets its power supply from the connected rechargeable battery.

Now you can see on the display at the point FREE MEMORY how much free memory is left on the SD-card and its total amount of storage. Also the amount of recordings on the SD-card (FILES ON CARD) is displayed, and how many recordings in the current night have been made so far. (RECORDS THIS NIGHT).

At the beginning of the scanning mode one new recording is already on the SD-card, it is the test-signal from the microphone-test. At the right bottom edge of the display the signal level is indicated, which results from this microphone test. It is delivered as deviation in dB (logarithmic) from the reference value. If it indicates a deviation of 0 dB, there is no deviation. A deviation of -6 dB indicates that the sensitivity is cut in half.

If a bat call is detected the display illumination changes from blue to purple and at the bottom of the display the sound volume of the call recorded is illustrated with a bar.

After the chosen stopping time, the GSM-batcorder stops the bat detection and carries out another microphone test. Afterwards a status-SMS is send and the GSM-batcorder goes into standby-mode, the display changes then back to yellow. The Timer stays active though and when the starting-time is reached again the GSM-batcorder starts recording again automatically.

With the end of the recording session the GSM-batcorder is again connected to the mains power supply and the rechargeable battery is recharged.

If the ON/OFF-button is pressed while the Timer is activated, it is displayed that the Timer is active. By pressing the “left-arrow-button” (◀) now the GSM-batcorder goes back to Standby mode with active Timer, with pressing the “right-arrow-button” (▶) the timer will be deactivated.

## Remote Control of the GSM-batcorder through SMS

Before you can use the SMS-function, all necessary steps from the GSM-setup to a successful transmission of a test-SMS must have been carried out. (See: SIM-card installation and GSM-TEST SMS).

### When does the GSM-batcorder try to connect with the mobile network?

- After the device got started by keystroke.
- As soon as the GSM-batcorder changes from “SETTINGS” (green display) to “TIMER ACTIVE” (yellow display).
- If the end of the recording time has been reached (blue display) and the GSM-batcorder changes into “TIMER ACTIVE” (yellow display) again.

### When can the GSM-batcorder be remotely controlled by SMS-commands?

- In all Settings-menus (green display), **with one exception**: As long as the GSM-batcorder is in the “GSM-settings” menu, no SMS can be received.
- If the Timer is activated (Timer enable – yellow display).

If the connection setup to the mobile network has been successful, this is indicated with a “G” at the upper line of the menu.

At the beginning of a recording session to its end, the GSM-module is deactivated! During that time no SMS can be received!

### Important information for the SMS-control

- If the connection setup is not possible or fails, the attempt is not repeated. The GSM-module stays offline until the next above described moment. (See: When does the GSM-batcorder try a connection setup to the mobile network?)
- Do not send a SMS shortly before the recording session starts. The SMS communication within the GSM- network can take several minutes under unfavorable reception conditions respectively high network load. Thus the GSM-batcorder may miss the Timer’s wake up call and would not start at the scheduled time.
- SMS-messages which the GSM-batcorder could not receive (module has been offline, other disturbances led to a non-receipt), are forwarded afterwards by the some mobile network operators, as soon as it has logged into the network again. This can lead to a delayed or unwanted execution of orders (max. 10 SMS)!
- Orders are case insensitive.
- Not recognized orders (typing errors) are acknowledged with “COMMAND NOT RECOGNIZED”.

- All SMS have to start with “GSM”, otherwise the device cannot execute them and will ignore them.
- If the changes have been successful, always all settings will be send back (Answers are described at “GSM SEND SETTINGS”)
- If the change command has been identified, but the chosen new value is not allowed, then a list with all permitted values is send. For example with the QUALITY parameter it would send: “Invalid parameter. Quality can be set from 0 to 40 or 99.”

## SMS-Commands

- To request **Current Settings**: “GSM SEND SETTINGS”

Answers: Filecode, Quality, Threshold, Posttrigger, Cut Off Frequency, Noisefilter, MCF, start/stop time

- To request **Current Status**: “GSM SEND SETTINGS”

Answers: Filecode, free memory, total number of recordings, number of recordings of the previous night, battery voltage, external voltage (power pack), current temperature, USB yes/no

- To request **Current Time**: “GSM SEND CLOCK”

Answer: “Actual time: 00:00”

- To set **all settings to default**: “GSM SET DEFAULTS”

Answer: All current settings are send.

- To set the **Quality** value: “GSM SET QUALITY xy”

For example: “GSM SET QUALITY 20”, allowed values: 0 – 40, 99

- To set the **Threshold** value: “GSM SET THRESHOLD xy”

For example: "GSM SET THRESHOLD 27", allowed values: 18, 24, 27, 30, 36, 42

- To set **Posttrigger** value: "GSM SET POSTTRIGGER xy"

For example: "GSM SET POSTTRIGGER 200", allowed values: 0, 100, 200, 300, 400, 600, 800

- To set **cut-off Frequency**: "GSM SET FREQ xy"

For example: "GSM SET FREQ 16", allowed values: 14 to 110

- To set **Noisefilter** value: "GSM SET NOISEFILTER xy"

For example: "GSM SET NOISEFILTER OFF", allowed values: 0 – 10, OFF

- To set **MCF**: "GSM SET MCF xy"

For example: "GSM SET MCF 07", allowed values: 0 – 64, one- digit numbers have to be indicated with a leading zero.

- **Change Timer Starting-Time**: "GSM SET START 00:00"

For example: "GSM SET START 20:08", one digit minutes or hours have to be indicated with a leading zero.

- **Change Timer Stopping-Time**: "GSM SET STOP 00:00"

For example: "GSM SET STOP 07:15", one digit minutes or hours have to be indicated with a leading zero.

- **Change Time**: "GSM SET CLOCK 00:00"

For example: "GSM SET CLOCK 07:05", one digit minutes or hours have to be indicated with a leading zero.

- **Change receiver of SMS:** "GSM SEND ME SMS"

All following SMS will be send to the sender of this SMS. The former and the new receiver will get the following SMS: "Status-SMS receiver has been changed."

## USB-mode

### Basics

With the GSM-batcorder you have the possibility to retrieve the data from the SD-card without having to remove it laboriously. This is possible through the USB-mode even while operating. Only during a recording session or while in a Settings-menu this access is locked. You can connect an external end device to the USB-port and can then retrieve the data from the SD-card. To connect the end device to the GSM-batcorder you need an USB-cable with a Mini-USB-Plug for the GSM-batcorder and the appropriate connector plug at the end device. (Not included in delivery!)

So with a Raspberry Pi and the appropriate add-on program, it is possible to secure the data from SD-card to an external data medium. On our homepage you can find all information concerning this saving procedure, other developments and all relevant downloads. (See: Support)

### Access to the SD-CARD via USB-Port

The SD-card is either activated for internal access or for external access via an external end device. The access through the USB-port is as following:


As soon as a USB-connection as been established (cable connected, external device activated (computer or Raspberry Pi)), the GSM-batcorder builds up a connection. At the status line the "USB" mark is displayed. The real data connection can require a few seconds longer.

The external end device only gets access to the SD-Card, if:

1. You are at the MAIN menu, you can establish an access to the SD-card via the USB-port by hand. More about that see below.
2. You are the TIMER-ENABLED mode, out of a recording session (yellow display). More to it also below.
3. The GSM-batcorder has been turned off and you connect an active external end device via USB with the GSM-batcorder. Also see further below.

First you have to connect an USB-cable. (At the status line the “USB” mark is displayed.)

To 1. :

By simultaneously pressing the “Fn”-button with the “down arrow”-button  the access to the SD-card for an external end device is cleared. As soon as the connection is established, the message “USB CONNECTED” appears on the display.

If you want to go back to the MAINS menu you have to disconnect the USB-port first. Therefore you press the ON/OFF-button, at the display the message “DISCONNECTING USB” appears. The GSM-batcorder goes back to the main display (MAIN) and can now access the SD-card again.

The USB mark stays visible, even if the external end device has no access to the SD-card now.

To 2. :

In the TIMER-ENABLED- mode (yellow display) the external end device can again have access to the SD-card via the USB connection.

If the USB-connection has been technically established beforehand (for example to a Raspberry Pi) the SD-card will be connected with the end device automatically.

Access to the SD-card can also be established while the GSM-batcorder is already at the TIMER-ENABLED-mode by connecting an external end device. At the display “-- >USB CONNECTED< --” appears continuously. As long as the starting time for recording has not been reached, the data from the SD-card can be read out by a connected Raspberry Pi or a Computer. The connection will be interrupted from starting time on during the whole recording session. After stopping time the USB connection is again clear, and the connected external device can again have access to the SD-card and for example read out the data made during the recording session.

To 3. :

If the turned-off GSM-batcorder is connected to an active external end device via the USB-port, it starts automatically into the USB-mode (as described under point 1.). The data from the SD-card can so be read out comfortably without using any buttons to operate the GSM-batcorder. To turn the GSM-batcorder off again, you only have to softly pull the USB-cable off and interrupt the USB-connection.

This possibility allows an easy and fast access to the SD-card without further knowledge of the GSM-batcorder functions.

## Firmware Update

The GSM-batcorder-firmware is continuously developed further by us and of course the updates are free of charge. The updates for the GSM-batcorder can be installed with a SD-card. At our homepage you can find all relevant data for a download. The current software version of your GSM-batcorder is shown, when the device is started, displayed as Hxxx for the Hardware version and Sxxx for the Software version. It takes only a few steps to update the software. But it is highly important to follow each step exactly, as an update failure can make the GSM-batcorder inoperative!

### Requirement:

For the update you need a SD-card, which has already been accepted by the GSM-batcorder. (See: GSM-batcorder start-up, Preparation of SD-memory-card). This SD-memory-card has to be prepared as following. Please, **first read** each step thoroughly, **before** you execute the update!



*Warning: Deactivate all kinds of programs, which could access the SD-card in your computer unwanted and without any user interaction, such as virus scanners etc.*

### Step1: Prepare SD-memory-card with the GSM-batcorder

Insert the SD-card into the GSM-batcorder and erase all data either with the erase-function in the MAIN-menu (press Fn-button together with the arrow-up-button) or by choosing "Continue" at the start of the GSM-batcorder. (This request is made, when the SD-card for the GSM-batcorder unknown data!)

### Step2: Load update file onto the SD-card

Remove the SD-card from the GSM-batcorder and insert it into your computer's SD-card-slot. Copy the update file from the computer onto the SD-card. (Of course before you can do this, you have to download the file from our homepage onto your computer first. Be sure, that you copy the right file: For the GSM-batcorder!).

Do not change anything else on the card, that means do not erase, shift or copy any further files onto the SD-card! Also you have to make sure that no other programs try to have access to the SD-card while inserted in your computer as mentioned before! Remove the SD-memory-card as soon as you have copied all needed update files from your computer onto the SD-card.

**Step 3: Firmware Update**

Insert the SD-card into the batcorder again. Start the GSM-batcorder and follow the instructions shown on the display. If the update has been successful, the new software number is now shown at the right bottom of the display (SWXXX).

Note: With this SD-card you can now directly update other GSM-batcorders, you do not have to follow step 1 and step 2 again!

**Possible Errors**

The GSM-batcorder has been updated, but the device will not start or behaves undefined:

The update failed, possible reasons may have been for example: wrong download file, defective card or unnoticed access onto the SD-card while inserted into the computer.

Repairing is generally possible but only at ecoObs and not on location. Please get in contact with the Support.

## Installation on a wind turbine generator (WTG)

The installation of the microphone disc as well as the of the GSM batcorder's mounting rail should always be carried out by qualified personnel of the operator or the manufacturer of the WTG. Please get in contact with those before using the GSM-batcorder on a plant.

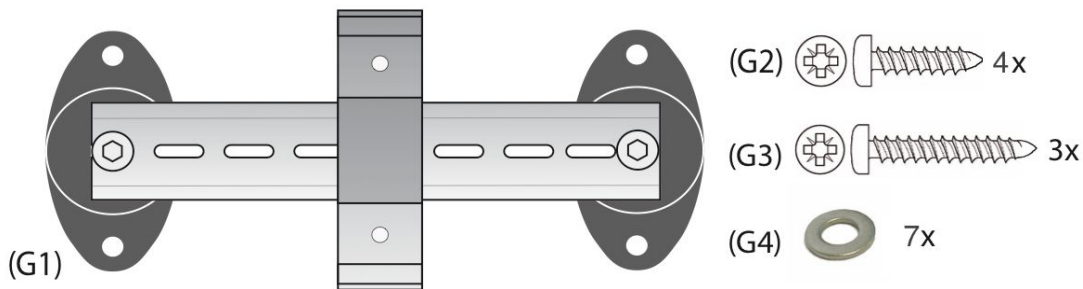
### Assembly parts for installation

(G1) Profile rail with pre-assembled vibration damper and fastening clip(s) for the GSM-batcorder

(G2) 4 x tapping screws C 5,5 x 13 H, for fixation of profile rail to the nacelle

(G3) 3 x tapping screws C 5,5 x 25 H, for fixation of microphone disc to the nacelle

(G7) 7 x washer dishes



### Additionally required material

- 230V extension cable, if there is no socket nearby
- Drilling machine
- Hole saw for a 100mm hole, for mounting the microphone disc to the nacelle
- Drill 3.5 mm or 4 mm depending on the nacelle material, to pre-drill the holes for the tapping screws
- Philips screwdriver
- Pencil or marker
- Long cable ties (included in delivery) to tighten the 6V- rechargeable battery to the profile rail (see: "Fox devices to the profile rail")
- Cable ties and adhesive tape to tighten all loose laid cables and for all other attachments
- Knife or scissors to cut down the cable ties or the tape

**Position in the nacelle**

The microphone and the mounting rails for the GSM-batcorder are fixed at the bottom of the plant's nacelle. So the microphone capsule looks down after installation.

On Vestas and on Enercon plants the location at the back ends of the plants, next to the emergency escape flap, has proven suitable for mounting the GSM-batcorder and its accessories.

Depending on the type of nacelle and available installation possibilities a modification of the construction may be necessary. The mounting rails can e.g. also be fixed vertically to structures/bars inside the nacelle. The microphone must not be installed too exposed (e.g. to a side panel or to the surface of the nacelle), because it then is too open to atmospheric conditions and also to draining rainwater and it will then wear out early. An installation at the bottom of the nacelle, at the side averted to the rotor, though is possible and reasonable, because there less turbulences do occur and therefore less noise and humidity resp. dirt are to be expected.

**Installation of the microphone disc**

The microphone capsule within the microphone disc is very sensitive against mechanical force. Make sure that the microphone capsule, embedded into the acrylic pane, is not touched during installation and transport. Also the surface of the acrylic pane must not be scratched!

For installation of the microphone disc it is necessary to cut a hole into the nacelle cover of a 100mm diameter. This measure can only be carried out by qualified personnel of the wind energy plant's operator or the manufacturer (strictly observe regulations!). The microphone disc can then be attached fittingly into the cut hole. For the tapping screws, holes have to be pre-drilled. The microphone disc can be used for marking the position of the holes. Pay attention to a precise fit of the rubber o-ring needed for seal.

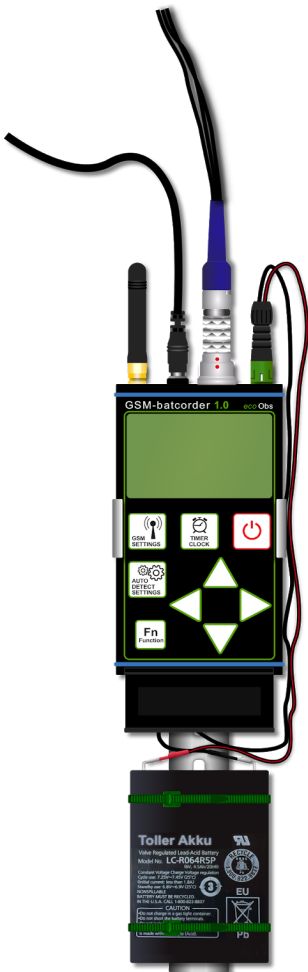
Pay attention: The distance from disc to GSM-batcorder must not be more than 65 cm! (Cable length of the microphone is 70 cm).

The microphone disc then is to be connected to the GSM-batcorder. Therefore you have to lock the microphone plug to the microphone jack on the GSM-batcorder without using any force or tools. Attention should be paid to a correct alignment of plug and jack (red marks have to match). A twisted connection leads to a loss of function.

### Installation of profile rail

The GSM-batcorder is fixed at the WTG-nacelle via a profile rail with a clip system (top-hat rail). The profile rail is attached to the nacelle cover (from inside) with dampers.

Lay down the rail at the chosen position onto the nacelle bottom and sketch the position of the pilot holes for the screws (G2). Use the enclosed washers (G4). Observe the proper distance to the microphone disc. Corresponding to the illustration the profile rail and the fastening clip are mounted and the GSM-batcorder can then be clicked into the fastener.



### Fastening GSM-batcorder and rechargeable battery on the profile rail

The GSM-batcorder is inserted into the fastening clip. The battery will also be mounted onto the profile rail with two long cable ties (enclosed in delivery) right below the GSM-batcorder. The battery has got a rubberized surface at its bottom side, and with this side the battery has to lie on the profile rail. The rubber prevents the battery from getting out of place. Be sure that the battery poles are faced towards the GSM-batcorder. Please leave enough space between GSM-batcorder and battery pack so that if necessary it is still possible to connect an USB-cable to the batcorder.

**GSM-batcorder Serial-Number**

Each device has a label with its serial number at its bottom side. This allows a definite identification of every GSM-batcorder. Please always quote this number when contacting the support.

**How to dispose old devices**

Of course we take back our old devices in conformity with the German ElektroG (German law, regulating take back and disposal of electric devices). Either we recycle it ourselves or we give the devices to a recycling company for disposal in accordance with the legal requirements. Do not dispose not working devices into the household garbage or the municipal waste, but send them back to us (even single components) free of charge! For further information or questions, please contact the Support.

**Support**

If problems or questions with the handling of the GSM-batcorder do arise which you cannot be solved by yourself, please do not hesitate to contact our Support with a detailed error description. In many cases questions can be solved by phone quick and reliable.

Have the GSM-batcorders Hardware and Software version numbers at hand (Hxxx Sxxx at the right bottom of the start screen).

Never send in a device unrequested.

If you are asked to send in the device, please use our form for returns, which you can download from our homepage at the download area. Please fill in the form completely.

Our contact data:

Mail: [info@ecoobs.de](mailto:info@ecoobs.de)

By phone: 0049 (0)911 – 376 80 53

In writing: ecoObs GmbH, Hermann-Kolb-Str. 35b, 90475 Nuremberg, Germany

## Technical Details

Product	<i>GSM-batcorder Modell 1.0</i>
Description	Call triggered, automatically working bat recorder

## Recording-/ File storage method

Type of recording	Real Time
Sampling Rate	500 kHz
Amplitude-resolution	16 bit
Sensitivity range	16 – 150 kHz (ca 32 dB loss at 150 kHz)
Storage procedure	Little Endian, PCM, without Header
Storage medium	SDHC-memory-card up to 32 GB SDXC-memory-card up to 256 GB

## Recording Characteristics

Type of microphone	FG series, Electret, power supply 1.3 V
Signal-Noise-Ratio (SNR)	> 80 dB
Directionality	0 to – 9 dB loss at 0 – 180° incidence

## Analog circuit

High-pass filter	16 kHz, Butterworth, 10 <sup>th</sup> order
Low-pass filter	150 kHz, Butterworth, 10 <sup>th</sup> order
Overall-gain	full scale deflection, calibrated to 96 dB SPL at 1 meter with 40 kHz

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**Power supply / Power consumption**

Power Supply	Lead-Gel-rechargeable battery 6V, 4.5 Ah
AC-adaptor	Input 100V- 240V 1A max, Output 12V 2.08A Typ: GSM36E12-P1J Manufacturer: Meanwell certificate: <i>EU-Guidelines MMD 93/42/EU</i> ESD air: EN61000-4-2:2009 Level 4 15kV ESD contact: EN61000-4-2:2009 Level 4 8kV
Power Consumption 12V adaptor: 6V lead acid battery:	max. 12W 150-250mW. Peak < 300ms: 10W
Temperature Range	0°C – 40°C
GSM-Modul:	Typ: GL865 DUAL Manufacturer: Telit certificate: <i>EU-Guideline RED 2014/53/EU from 16. April 2014</i>

Technical details are subject to change.

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**Attachments:**

- Declaration of EU Conformity GSM-batcorder
- Telit-GL865-V3.1-Declaration-of-Conformity
- Meanwell Declaration of Conformity

**Your notes:**

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## Declaration of EU Conformity

Déclaration UE de conformité



Productname: **GSM batcorder 1.0**

Manufacturer: ecoObs GmbH,  
Hermann-Kolb-Str. 35b  
90475 Nürnberg

*We declare under our sole responsibility that the product to which this declaration relates is in conformity with the following standard(s) or other normative document(s):*

*EU-Guideline EMC 2014/30/EU from February 26th 2014  
Electromagnetic Compatibility (EMC)*

*EU-Guideline RED 2014/53/EU from April 16th 2014  
Radio Equipment Directive (RED)*

*EU-Guideline RoHS 2011/65/EU from June 8th 2011  
Guideline on the restriction of the use of certain hazardous substances in electrical and electronic equipment*

*EU-Guideline LVD 2014/35/EU from February 26th 2014  
The Low Voltage Directive (LVD)*

**Nuremberg, 31.05.2017**



(Claus Schuster)  
**CEO, Hardware development**



(Dr. Volker Runkel)  
**CEO, Software**



## EU DECLARATION OF CONFORMITY [20400DOC00065A]

- 1 **GL865-QUAD V3.1, GL865-DUAL V3.1** (product name)
- 2 Telit Communications S.p.A. – Via Stazione di Prosecco, 5/B – 34010 Sgonico TRIESTE – ITALY (manufacturer)
- 3 This declaration of conformity is issued under the sole responsibility of the manufacturer
- 4 E-GSM 900, DCS 1800 Wireless Module  
SW Version(s) 16.01.163, 16.01.173



Operating frequency bands and related max radio-frequency power transmitted:

E-GSM 900: 34 dBm


DCS 1800: 31 dBm

- 5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 2014/53/EU (RED)
- 6 The conformity with the essential requirements set out in Art.3 of the 2014/53/EU has been demonstrated against the following harmonized standards:

Harmonized Standard reference	Article of Directive 2014/53/EU
EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013 EN 62311:2008	3.1 (a): Health and Safety of the User
Draft EN 301 489-1 V2.2.0, Draft EN 301 489-52 V1.1.0	3.1 (b): Electromagnetic Compatibility
EN 301 511 V12.5.1	3.2: Effective use of spectrum allocated

- 7 The conformity assessment procedure referred to in Article 17 and detailed in Annex III of Directive 2014/53/EU has been followed with the involvement of the following Notified Body:

Dekra Testing and Certification, S.A.U., Parque Tecnológico de Andalucía, C/ Severo Ochoa 2, 29590 Campanillas – Málaga – SPAIN, Notified Body No: 1909

Thus,  is placed on the product

- 8 The product can be considered compliant to the essential requirements set out in Art.3 of 2014/53/EU only in combination with the above-mentioned SW version(s).
- 9 The Technical Documentation (TD) relevant to the product described above and which supports this Declaration of Conformity, is held at: Telit Communications S.p.A., Via Stazione di Prosecco, 5/b - 34010 Sgonico – TRIESTE – ITALY

Trieste, 2017-08-07

**Quality Director**  
Guido Walcher

**Quality Manager**  
Cesare Robelli

EU-Type Examination Certificate No. 52843RNB.001

Technical Documentation: 30400TCF00085A

[www.Telit.com/RED](http://www.Telit.com/RED)

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Cap. Soc. € 3.000.000  
Partita IVA 03711600266  
Cod.Fisc. 03711600266  
Nr. R.E.A. TS-120027

Società soggetta all'attività  
di direzione e coordinamento  
da parte di Telit Communications PLC  
con sede in Londra (art.2497 bis C.C.)

Società con socio unico  
(Telit Communications PLC)



## Declaration of Conformity

For the following equipment :

Product Name: AC/DC Switching Adaptor

Model Designation: GSMwxy (w=18,25,36 : x=B,E : y=05,07,09,12,15,18,24,48)

is herewith confirmed to comply with the requirements set out in the Council Directive, the following standards were applied :

**RoHS Directive (2011/65/EU)**

**MDD Directive (93/42/EEC)**

EN60601-1:2006+A11+A1+A12; EN60601-1-11:2010

TUV certificate No : TA50266669

**EMI (Electro-Magnetic Interference)**

Conducted emission / Radiated emission

EN55011:2009+A1:2010

Class B

Harmonic current EN61000-3-2:2014

Voltage flicker EN61000-3-3:2013

**EMS (Electro-Magnetic Susceptibility)**

EN60601-1-2:2007

ESD air EN61000-4-2:2009 Level 4 15KV

ESD contact EN61000-4-2:2009 Level 4 8KV

RF field susceptibility EN61000-4-3:2006+A1:2008+A2:2010 Level 3 10V/m

EFT bursts EN61000-4-4:2012 Level 3 2KV/5KHz

Surge susceptibility EN61000-4-5:2014 Level 3 1KV/Line-Line

Conducted susceptibility EN61000-4-6:2014 Level 3 10V

Magnetic field immunity EN61000-4-8:2010 Level 4 30A/m

Voltage dip, interruption EN61000-4-11:2004 >95% dip 0.5 periods 30% dip 25 periods >95% interruptions 250 periods

**Note:**

The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete system, the final equipment manufacturers must re-qualify EMC Directive on the complete system again.

For guidance on how to perform these EMC tests, please refer to TDF (Technical Documentation File).

This Declaration is effective from serial number EB6xxxxxx

Person responsible for marking this declaration :

MEAN WELL Enterprises Co., Ltd.

(Manufacturer Name)

No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan

(Manufacturer Address)

Johnny Huang/ Manager, Certification Center :

(Name / Position)

(Signature)

Ted Cheng/ Director, Sales Dept. :

(Name / Position)

(Signature)

Taiwan

(Place)

Apr. 20th, 2016

(Date)